

1. (Original) An optical element for use in an adaptive-optical system, the optical element comprising:

a deformable optical surface;

an array of force devices coupled to the optical surface, each force device being configured, when actuated, to exert a respective force on a respective locus of the optical surface that imparts a respective localized deformation of the optical surface such that actuation of the force devices collectively forms the optical surface into a desired shape, the force devices being arranged into multiple sets, each force device being a member of a designated first set and a designated second set that is different from the first set;

at least one force controller coupled to the force devices of a respective first set and configured to cause, when activated, the force devices of the respective first set to apply respective forces to the respective loci; and

at least one braking controller coupled to the force devices of a respective second set and configured to prevent, when activated, a change in force exerted by the force devices of the respective second set and by at least one force device of the first set.

2. (Currently Amended) The optical element of claim 1, wherein:

each force device comprises a respective movable member;

~~the force controllers are~~ at least one force controller is configured to cause, when activated, the movable members of the force devices of the respective first set to apply respective forces to the respective loci; and

the at least one braking controller is configured to prevent, when activated, a change in force exerted by the movable members of the force devices of the respective second set and by the movable member of at least one force device of the first set.

3. (Original) The optical element of claim 1, wherein the first set and second set are arrayed rectilinearly with respect to each other.

4. (Original) The optical element of claim 3, wherein each force device comprises a respective movable member that is actuated and braked by a respective combination of a force controller and a braking controller that is unique for each force device.

5. (Original) The optical element of claim 3, comprising multiple first sets and multiple second sets of force devices, wherein each first set is actuated by a respective force controller and each second set is braked by a respective braking controller.

6. (Original) The optical element of claim 5, wherein:
each first set and each second set comprises multiple respective force devices; and
the number of force controllers is less than the number of force devices.

7. (Original) The optical element of claim 6, wherein the number of force controllers and braking controllers is less than the number of force devices.

8. (Original) The optical element of claim 1, wherein each force device comprises a respective piston situated in and movable with respect to a respective cylinder.

9. (Original) The optical element of claim 1, wherein each force device is electrically actuated.

10. (Currently Amended) The optical element of claim 1, wherein each force device is hydraulically actuated.

11. (Original) The optical element of claim 1, wherein each force device is pneumatically actuated.

12. (Currently Amended) The optical element of claim 1, wherein each force device is magnetically braked by ~~the~~ a respective braking controller.

13. (Original) The optical element of claim 11, wherein the respective braking controller applies a magnetic field to the force device, the magnetic field having a direction that is at a right angle to a force axis of the force device.

14. (Original) The optical element of claim 1, wherein the force devices are electrically braked by respective braking controllers.

15. (Currently Amended) The optical element of claim 1, wherein the force devices are hydraulically braked by ~~the~~ respective braking controllers.

16. (Currently Amended) The optical element of claim 1, wherein the force devices are pneumatically braked by ~~the~~ respective braking controllers.

17. (Original) The optical element of claim 1, configured as a mirror, wherein the deformable optical surface is a reflective surface of the mirror.

18.-38. (Canceled)

39. (Original) An optical system, comprising an adaptive-optical element, the adaptive-optical element comprising:

a deformable optical surface;

an array of force devices coupled to the optical surface, each force device comprising a respective movable member that is configured, when actuated, to exert a respective force on a respective locus of the optical surface that imparts a respective localized deformation of the optical surface such that actuation of the force devices collectively forms the optical surface into a desired shape, the force devices being arranged into multiple sets, each force device being a member of a designated first set and a designated second set that is different from the first set;

at least one force controller coupled to the force devices of a respective first set and configured to cause, when activated, the movable members of the force devices of the respective first set to apply respective forces to the respective loci; and

at least one braking controller coupled to the force devices of a respective second set and configured to prevent, when activated, a change in force exerted by the movable members of the force devices of the respective second set and by the movable member of at least one force device of the first set.

40. (Original) A lithographic exposure system, comprising an optical system as recited in claim 39.

41. (Original) The lithographic exposure system of claim 40, configured for using a beam of extreme ultraviolet light as a lithographic exposure light.

42.-43. (Canceled)

44. (Original) An optical system, comprising an adaptive-optical element, the adaptive-optical element comprising:

a deformable optical surface;

an array of force devices coupled to the optical surface and configured to exert respective forces on the optical surface that impart respective localized deformations of the optical surface so as collectively to form the optical surface into a desired shape, the force devices being arranged into braking groups and force-altering groups, each force device being a member of a designated braking group and a designated force-altering group;

at least one force controller coupled to the force devices of a respective force-altering group and configured to cause the force devices of the respective force-altering group to apply respective forces to respective loci of the optical surface so as to deform the optical surface; and

at least one braking controller coupled to the force devices of a respective braking group and configured to prevent, when activated, a change in the respective forces applied by the respective force devices of the respective braking group when the braking controller is activated.

45. (Original) A lithographic exposure system, comprising an optical system as recited in claim 44.

46. (Original) The lithographic exposure system of claim 45, configured for using a beam of extreme ultraviolet light as a lithographic exposure light.

47.-93. (Canceled)